

The following were found in No. 4, R. 7, just across the line from Attean.

On the muddy bank of Moose River: *Alopecurus geniculatus* L., var. *aristulatus* Torr., *Callitriche palustris* L., *Ilysanthes dubia* (L.) Barnh.

In Moose River: *Nymphaea microphylla* Pers.

In woods near the river: *Cinna latifolia* (Trev.) Griseb., *Solidago macrophylla* Pursh.

SKOWHEGAN, MAINE.

ANTENNARIA ALPINA AND A. CARPATHICA.

THEO. HOLM.

IN view of the fact *Antennaria alpina* (L.) R. Br. and *A. carpathica* (Wahlenb.) R. Br. are about to be excluded from the flora of this continent according to some authors of recent date, the writer wishes to call attention to some points relative to the geographical distribution and external structure of these species.

While both species were included by Asa Gray in his Synoptical Flora of North America, and by John Macoun in his Catalogue of Canadian Plants, with a range extending from Labrador throughout the northern part of the continent to Alaska and Oregon, Greene has expressed the opinion that *A. alpina* is not known to occur on our continent "unless perhaps a sheet of specimens in Canadian Survey collection, said to have been collected on the Arctic sea coast by Dr. Richardson, may represent it;"¹ and this author makes the following statement about *A. carpathica*: "I am still without evidence that true *A. carpathica* exists in North America" (l. c. p. 289). In Coulter & Nelson's New Manual of Botany of the Rocky Mountains (1919) twenty-one species of *Antennaria* are enumerated, but *A. alpina* and *A. carpathica* are excluded; finally in P. A. Rydberg's Flora of the Rocky Mountains and Adjacent Plains (1917) *A. carpathica* has been left out, and *A. alpina* is credited only to some of the British provinces.

However, if we combine the geographical distribution of both species in the Old World with that given by Gray and Macoun for this continent, we notice at once that *A. alpina* is circumpolar, and *A.*

¹ Greene, E. L., Pittonia Vol. III. Washington 1896-1898, p. 284.

carpathica almost so. Thus we should naturally expect that both species would be indigenous to the greater part of the Rocky Mountain region, and it would indeed seem very unnatural, if neither of them had found its way to this continent, inasmuch as *A. alpina* is frequent in Greenland, and the other species has been reported from many stations in Arctic Siberia.

It is true that only the pistillate plant of *A. alpina* is common, and that the staminate plant, so far, has only been found a few times in Scandinavia, France and Alaska, but, on the other hand, it is well known that the pistillate plant through parthenogenesis produces fertile seeds in abundance¹; the same being the case with several of the other species endemic to this country. It would thus, from a geographic point of view, be most natural to expect that these two species do occur on this continent, and let us now examine the reason why they have been denied citizenship.

By a careful examination of various collections the result has been, that both species exist in Canada as well as in the United States, and by comparing the statements of certain authors, who have excluded these species, it becomes evident that the literature has either been ignored or completely misunderstood. For instance, with regard to the staminate plant of *A. alpina*, Greene states that "true *A. alpina* is one of the few species of its genus in which the pappus-bristles are only more strongly barbellate at the apex without being clavellate-dilated" (l. c. p. 284). None of the Scandinavian authors, who had the opportunity to examine this extremely rare plant, has made any statement to that effect, and Lamarck & De Candolle (*Flore Française*) describe the pappus thus: "les poils sont filiformes et dentés dans les fleurs fertiles, et écrasés au sommet en massue aplatie, dans les fleurs stériles."

Considering the vast distribution of these species, it must be expected that they do not always exhibit the same external structure, but that they sometimes appear as varieties, more or less well marked. Moreover we must remember that species which depend on parthenogenesis, as our *A. alpina*, are known to be polymorphic.

Let us then examine *A. alpina* as it occurs in Europe and Asia. In the typical plant the leaves are glabrous on the upper face, villous or

¹Kerner: Parthenogenesis einer angiospermen Pflanze (Sitzungsber. der Acad. der Wissensch. Wien. Math.-naturw. Cl. Vol. 74. 1876. p. 659). See also Juel, H. O.: Parthenogenesis bei *Antennaria alpina* (L.) R. Br. (Bot. Centralbl. Vol. 74, No. 13. 1898. p. 1).

tomentose on the lower. But in Greenland and Scandinavia a variety is not uncommon with the leaves villous on both faces, by Lange described as var. *canescens*¹; this variety is thus identical with var. *Friesiana* Trautv.² and has been collected in Labrador³. The width of the leaf-blade is also subject to variation, and in Greenland I noticed the leaves to be broader in the var. *canescens* than in the typical plant. The same observation was made in Colorado, where the variety was found on several peaks, at elevations from 11,500 to 13,000 feet. Then there is also a var. *corymbosa* Fries⁴; "triplo majus, corymbo multifloro, pedunculis praelongis subfastigiatis," recorded from Lapland and Norrland. A monocephalous state, known in many other *Compositae*, is known also in *A. alpina* viz. "*monocephala* DC.", from Alaska and Siberia⁵, but Kjellman⁶, who found it on the Asiatic coast of Bering Strait, observed that mono- and plio-cephalous stems may occur upon the same individual. In Greenland I found a very interesting form, perfectly glabrous, the so-called var. *glabrata* I. Vahl:⁷ "foliis utrinque viridibus, calathiis solitaris iv. paucis, periclinio glabriusculo." This variety has since been raised to specific rank by Greene as *A. glabrata* (l. c. 285), and recently also by Porsild⁸ under the same name. However, the few points by which it differs from the typical *A. alpina* are variable in the latter, thus it would seem more correct to consider it a variety only.

Similar variation is known in several other plants, for instance *Gnaphalium uliginosum* L. var. *nudum* Ehrh., *Arabis hirsuta* Scop. var. *glaberrima* L., *A. petraea* Lam. var. *glabra*, *A. alpina* L. var. *glabrata*, etc.

Finally a variety *ungavensis* has been described by Prof. Fernald (l. c.), distributed as *A. labradorica* Nutt., but evidently distinct from this; it differs from the *A. alpina* by its very tall stature, numerous

¹Flora Danica: XLVII. Tab. 2786. Copenhagen, 1868.

²Trautvetter, E. R.: Flora terrae Tschuktschorum (Acta Hort. Bot. Petr. VI. p. 1. 1879).

³Fernald, M. L.: Some allies of *Antennaria alpina* from Newfoundland and the Labrador Peninsula. (RHODORA, XVIII, p. 237. Boston, 1916).

⁴Fries, Elias: Nov. Florae Suecicae Mant. III. p. 102. 1832-1842.

⁵Trautvetter, E. R.: Plantas Siberiae Borealis ab A. Czekanowski et F. Mueller annis 1874 et 1875 lectas. (Acta Hort. Bot. Petr. V. p. 1. 1877).

⁶Kjellman, F. R.: Asiatiska Beringsunds-Kustens Fanerogam-flora (Vega-Exped. vetensk. arb. p. 502).

⁷Flora Danica, l. c. Fig. 4.

⁸Porsild, M. P.: On the genus *Antennaria* in Greenland. (Medd. om Groenland; LI. Copenhagen, 1915.

cauline leaves, and in the long-peduncled lower head of the two-headed inflorescence.

These are, so far as I know, the described varieties of *A. alpina*, but it has also been stated by several authors abroad that the species varies with reference to the development or absence of stolons, etc. Porsild (l. c. p. 269) for instance summarizes the variations in the Greenland plant as follows: "Shoot-formation; the procumbent runnerlike shoots are more or less developed, or sometimes quite missing. Hairiness; sometimes the leaves are closely white-felted on their lower surfaces only (*A. alpina* α , in Lange, Flora Danica) and at other times on both surfaces (β *canescens* Lge.); or the felt can be more loose and tufted. Besides this, the seasons can influence the hairiness, the earliest shoots in spring often being more densely felted than those developed later. The inflorescence; the number and size of the heads (capitula). The colour of the involucre is generally dark olive-brownish, but sometimes it can be more reddish. I have however never seen such light reddish-brown colours as are apparently common in Scandinavian specimens." By this same author an interesting series of figures is given, which show the variation in outline of the leaves, and also of the involucre, as observed by him in the species of the genus, represented in Greenland. The comparative method followed by Porsild is highly to be recommended, and would undoubtedly, if adopted by American authors, prove very successful in reducing the almost untold number of species described recently.

According to Fernald the var. *canescens* replaces in Eastern America the typical green-leaved plant, and such specimens are recorded from Labrador; as stated above this same variety is represented in Colorado, where I found it on James's Peak, Mt. Massive, Mt. Kelso, Long's Peak, headwaters of Clear Creek, etc.; but I have also seen specimens from Wyoming: Teton Mts., from Central Montana: Little Belt Mts., from Oregon: Crater Lake, etc., most of these having been labelled *A. mucronata* E. Nelson. In establishing this species Mr. Nelson¹ compares it with *A. umbrinella* Rydbg.; a comparison, however, with *A. alpina* might have proved these to be identical.

Now with respect to *Antennaria carpathica* (Wahlenb.) R. Br., this also has met the same fate as *A. alpina*. When establishing the species *A. lanata* Greene (l. c. p. 289) states, that in *A. carpathica* "the leaves are green and glabrate above." By Hooker (Flora Bor.

¹Nelson, Elias: The Wyoming species of *Antennaria* (Bot. Gaz. March 1899).

Am.) the plant is considered a variety: *lanata* of *A. carpathica*. I am at a loss to understand how Greene could make any such statement, since the European authors, who were familiar with the plant, describe the leaves as follows: Wahlenberg¹ says about the Swedish plant: "β foliis inferioribus lanceolatis, trinerviis subtus (supraque) lanuginosis;" Blytt² and Hartman³ describe the leaves as white- or grayish-woolly on both faces; Koch⁴ writes "foliis utrinque lanatis," and Trautvetter⁵ describes the variety *Laestadiana*; "foliis utrinque magis minusve albo-tomentosis." Finally Elias Fries (Nov. Fl. Suec. l. c.) demonstrates that *A. carpathica* shows exactly the same variation as *A. alpina* with regard to inflorescence and foliage. It may be mentioned at the same time, that *A. carpathica* is not enumerated by Ledebour in his *Flora Rossica*, but Trautvetter⁶, has recorded several stations for it in Russia and Siberia, "Zona artica Rossiae europaeae et Siberiae."

Having examined a number of specimens of *A. lanata* Greene I find it impossible to distinguish them from *A. carpathica*, but they all belong to the var. *lanata* Hook., and this variety occurs, furthermore, in Europe and Asia, as stated above. It is interesting to notice that a monocephalous state is known also in this species according to Gray (l. c. p. 232). Thus these two species, *A. alpina* and *A. carpathica*, are remarkably uniform in their modes of variation. With regard to the var. *pulcherrima* Hook. of the latter, this is a lowland plant, and seems quite different from *A. carpathica* vera; thus it is undoubtedly correct to consider it a distinct species: *A. pulcherrima* Greene.

Having studied the genus in the Arctic regions, in the Rocky Mountains of Colorado, in Maryland and Virginia the writer has reached the conclusion that the genus is very susceptible to the influence of environment; the variation according to latitude resembles that of altitude in the mountains; with respect to the lowland species, specimens growing in the open, in fields, open thickets, etc., are sometimes quite distinct from those which inhabit the woods, as may be seen especially in *A. arnoglossa* Greene, *A. fallax* Greene, *A. alsinoides* Greene and *A. neodioica* Greene.

CLINTON, MARYLAND.

¹Flora Suecica. Upsala 1826. p. 515.

²Norges Flora. Christiania 1874. p. 575.

³Skandinaviens Flora. Stockholm 1879. 11th ed. p. 13.

⁴Synopsis Florae Germanicae et Helvetiae. Leipzig 1857. Vol. 1. p. 312.

⁵Flora terrae Tschuk. l. c. p. 24.

⁶Incrementa Florae phaenogamae Rossicae. Vol. 2. Petropolis 1883. p. 412.